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HOW TO LOOK AT BUILDINGS

An Introduction to the Study of Architectural Design

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Grade X{ Course in Art, Section IV, A

INTRODUCTION

Architectural Design is the process whereby man creates buildings in which he may carry on his multifarious activities with the maximum comfort and health of both mind and body. Implicit in that statement is the suggestion that Architecture is something more than mere building or the erection of shelters replete with labour-saving gadgets and inside plumbing. A building devoid of any claim to beauty falls outside the realm of Architecture. The birth of architectural design, as distinct from building, probably coincided with primitive man's first urge either to add something to, or to subtract something from his cave or hut simply because it appealed to his sense of beauty to do so. Since that time the ideal of architectural design has been the development of aesthetic solutions for highly practical problems.

As well as having sufficient training and technical knowledge to evolve a perfectly organized plan, the architect must also be able to visualize the aesthetic effects of his completed design. In imagination he approaches the proposed building from every angle and wanders in and out of it, catching those fleeting impressions of beauty that he will later interpret to Everyman in brick, stone, concrete, wood, and other materials. His degree of success will depend upon a number of factors, not the least of which is his creative ability in the handling of three-dimensional forms. Failure to accord adequate consideration to such elementary principles of design as proportion, balance, rhythm, emphasis, and colour in his treatment of these three-dimensional forms will inevitably result in ugliness and chaos, rather than beauty and order.

Although the vital necessity of good planning and all that it implies cannot be over-emphasized, the prime purpose of this pamphlet is to deal only with those elementary principles of architectural design most directly concerned with the aesthetic, rather than the technical qualities of buildings. It is intended to serve not as a classroom text-book, but as an introduction and stimulus to further study in a branch of the arts with which the average teacher may not be too familiar.

1. THE STUDY OF BASIC BUILDING FORMS

Irrespective of the number or size of its parts, any building can be broken up into a series of geometrical shapes. As applied to building design these shapes may be considered the Basic Building Forms. With their many variations, the geometrical shapes outlined below suggest an unlimited range of possible Building Forms in the design of a new structure or in the analysis of

an existing one. The addition of ornamental details should in no way detract from the pristine beauty of the geometrical shapes.

Although a building is essentially a space enclosed by walls and roofs, its ultimate exterior form is composed of one or more "Solids". Thus a building may be referred to conveniently as a rectangular, conical, cylindrical, or other form of solid. This use of the term solid serves to distinguish further the general forms and wall areas from the shape of such "Voids" as windows and doors. Where the structural method of spanning an opening is obvious, as in doors and windows, the opening is either a curved or rectangular "Void". These void shapes are based on the two fundamental types of construction in common use, either the Post and Arch (curved), or the Post and Lintel (rectangular).

The following geometrical shapes are the principal Basic Building Forms:

(a) Rectangular solids—Flat-roofed buildings, piers, Figs. 1a, 1b, 7a, 9.

(b) Prismatic solids—Tents, gable roofs, Figs. 2, 20, 28.

(c) Conical solids—Tents, roofs, spires, Fig. 3.

(d) Pyramidal solids—Cottage roofs, spires, Figs. 4, 23, 26, 30.

(e) Cylindrical solids—Staircase halls, silos, columns, Figs. 5, 22.

(f) Semi-spherical solids—Domes, Fig. 6.

(g) Rectangular voids—Post and lintel construction: bridges, rooms, doors, and windows; cantilever construction: corner windows, floor projections, and balconies, Figs. 7a, 7b, 18, 19, 22.

(h) Curved voids—Post and arch construction: semi-circular, elliptical, and pointed arches in bridges, rooms, doors, and windows, Figs. 8, 9, 28.

2. THE STUDY OF BUILDING PROPORTIONS

There are two aspects to the study of building proportion. The first is proportion in the sense of relative size, and is generally thought of in terms of the human figure. A building and its parts are long, short, high, low, wide, or narrow in comparison with the human figure as a unit of measurement. Figs. 9, 21, and 23 illustrate how such a unit of measurement provides a key to the general size of a building as well as to its doors, windows, and details. Without some such appreciable unit as a basis for comparison, any mental estimate of size would be sheer speculation. Although there is very little difference in the heights of Figs. 20 and 9 as they are drawn, the latter represents a much taller building because its related human figure is proportionately smaller than that in Fig. 20. The second aspect is the relationship between length, width, and height as a purely aesthetic problem entirely divorced from any consideration of the human figure. The proportions of the Palazzo Riccardi, Florence (Fig. 9), are satisfying because of the relation of length to width to height, and not because the cornice happens to be thirteen and one half human figures above the pavement. Good proportions may be reduced to a simple mathematical formula for the beginner. However, any degree of subtlety in proportion may be successful in the hands of a skilled designer.

The simplest geometrical solid of enduring and satisfying proportions is the cube (Fig. 10). All other rectangular solids may be considered as variations of the cube, and as such are more likely to prove satisfactory if they are some definite fraction or multiple of it. A cube sixteen to sixteen to sixteen (the unit is irrelevant) is satisfying (Fig. 10), but a rectangular solid fourteen to fifteen to sixteen is not, because it lacks proportional clarity (Fig. 11). Any simple proportion obviously under or over these is more likely to be good (Fig. 12).

Two-dimensional areas also must possess proportional clarity, either as component surfaces of a solid, or as isolated units. Surfaces eight to eight (Fig. 13), six to eight (Fig. 14), or ten to eight (Fig. 15), are usually satisfying, but surfaces eight to seven (Fig. 16), or eight to nine (Fig. 17) are not, because they are lacking in this quality. Doors (Fig. 18), windows (Fig. 19), and their sub-divisions are subject to the same rules of proportion as those for general surfaces and solid shapes.

A building of essentially vertical proportions (a building higher than it is wide or long), is more exciting and less restful to the eye than one of horizontal proportions. For this reason houses are more attractive when built long and wide rather than short and high. The horizontal proportions thus produced impart an appearance of the building's being married to the ground. (Interior proportions are also relevant, but are specially studied in Section IV, B.)

3. THE STUDY OF BUILDING DESIGN

The completed design of a building is usually the result of a series of compromises between practical requirements as worked out in the plan, and aesthetic effects as expressed by the exterior elevations. Location, size, topography and orientation of the site; the requirements of the client, the general architectural character of the neighbourhood, and the funds available, are some of the factors that influence and help to formulate the architect's visualization of the finished group of Basic Building Forms. Although the plan ultimately determines the general disposition of the elevations, it can be successfully evolved only if the original conception of suitable and desirable Basic Building Forms is kept constantly in mind. The whole question of building design resolves itself into a series of compromises between plan requirements and an effort to achieve in the elevations (a) proportion, (b) balance, (c) rhythm, (d) emphasis, and (e) colour harmony.

(a) Proportion.

(See "2. The Study of Building Proportions")

(b) Balance.

A consideration of balance in architectural design must necessarily include the supplementary quality of direction. It is desirable to treat them simultaneously because both may occur in the same elevation either in combination or singly. A balanced elevation is one in which the components are designed to maintain a state of equilibrium about the vertical axis of the dominant form.

If an elevation is quite symmetrical, perfect balance is achieved with a minimum suggestion of direction (Figs. 20 and 21). Direction is that quality in the design of an elevation that leads the observer's eye from the general masses and details to the most important element or vice versa. If an elevation is essentially unbalanced a very strong suggestion of direction is present (Fig. 23).

If one thinks of the see-saw it becomes apparent that balance may be obtained through either a symmetrical (Fig. 24) or an asymmetrical (Fig. 25) arrangement of forms. Similarly, balance may be achieved in the elevation of a building by a symmetrical or asymmetrical arrangement of components about the vertical axis of the dominant form. In much of the domestic architecture of the eighteenth and early nineteenth centuries in Ontario, symmetry in all four elevations was the keynote of the design; quite often imposed at the expense of certain practical requirements and the exclusion of any suggestion of direction in the mass outline. The elevations of the Oke House at Welcome, Ontario, reveal balance through symmetry about central vertical axes containing entrances as the focal points of the designs (Figs. 20 and 21). The hypothetical house illustrated in Fig. 26 is an example of asymmetrical balance in elevational design. With the axis and the chimney of the dominant form off centre, the composition requires both wings to create a feeling of balance. If the left wing only were omitted, the absence of balance would be obvious; and if the right wing only were omitted, the absence of balance would be less obvious, but the composition would assume a sense of lateral direction more suggestive of a side than a front elevation. Although asymmetrical compositions permit greater freedom in planning, they demand a much higher degree of skill in designing the elevations than do symmetrical compositions. Modern architects strain far less for symmetry at all costs than did their eighteenth-century predecessors.

A sensation of direction in the elevations of a design springs from a logical expression of the important features of the plan. As those features are dominant by reason of their size and/or position, the assumption is that the observer's eye travels from the minor elements to the major one, or vice versa. In elevations of vertical proportions the sense of direction is vertical, whereas in elevations of horizontal proportions and treatment the sense of direction is horizontal, or lateral. If the composition is essentially horizontal, then the direction may be from right to left, from left to right, or possibly from both ends toward the centre. Although direction may be present in a symmetrical elevation, the more unbalanced it is, the more pronounced is the sensation of direction it inspires (Figs. 22 and 23).

There are few better examples of balance and direction combined in the same design than Saint Andrew's Church at Niagara-on-the-Lake, Ontario. The symmetry of the front elevation creates perfect compositional balance (Fig. 22). Direction is attained in the side elevations by the entrance portico and the steeple being in juxtaposition at one end of the composition (Fig. 23). As well as the buildings already referred to, the automobile, aeroplane, steamship, and the lowly kitchen chair are all excellent examples of balance and direction in design.

(c) Rhythm.

Architecture has been described as "frozen Music," of which the essence is rhythm. With such an analogy in mind it is difficult to find a word more

descriptive than "rhythm" of the orderly repetition of the characteristic features of a building. Main roof slopes are echoed in the pitch of the minor gables, dormer windows, and chimney offsets (Fig. 26). The shape and proportions of a wall area are often repeated in the architectural treatment of its doors, windows, and ornamental details. This kind of rhythm is most common in wall areas having only one opening, or one ornamental feature, such as a niche. There is a strong feeling of rhythm in a rectangular wall containing a square-headed opening, and in a gable wall containing a semi-circular-headed or pediment opening (Figs. 27, 28 and 29). Possibly rhythm can be most readily appreciated in the sustained recurrence of common forms such as the columns of the Parthenon, the arches of a Roman aqueduct, the buttresses of a Gothic cathedral, and in the fenestration of the Palazzo Riccardi (Fig. 9) and Saint Andrew's Church (Fig. 23).

(d) Emphasis.

If carried to excess, mere repetition loses its rhythmic value and becomes sheer monotony. A too prolonged duplication of similar forms and details without variety or emphasis destroys interest and reduces what otherwise may be a well-proportioned and balanced building to a characterless and dreary mass. One important factor contributing to the creation and maintainance of interest in architectural design is the application of a definite gradation of emphasis in the treatment of the various parts of a building.

In buildings of two or more parts the emphasis should be placed on the most important one. It should dominate the whole composition by its size and/or position in relation to the other parts. The mere fact that there are several parts suggests that the building accommodates a number of activities of either equal or unequal importance, and this in turn offers a key to the proper degree of emphasis to be accorded to each in the design. In Fig. 26 the emphasis falls on the central mass because of its dominating size and position; also because it contains the main entrance. Buildings having sharply defined masses of unequal importance present few difficulties in the matter of emphasis. But where there are two or more masses of equal importance in the design it becomes necessary to introduce a neutral link to join and dominate both. The Victory Tower of the Parliament Buildings at Ottawa serves just such a purpose in the architectural composition (Fig. 30). Without it the central building would be uninteresting in spite of whatever other architectural merit it may possess.

In the preceding paragraph emphasis was discussed as applied to the arrangement and relationship of the Basic Building Forms. Emphasis is also an important factor in the elevational design of the individual building forms either as units of a group or alone. As the main entrance usually defines the vertical axis of an elevation, the entrance may be emphasized by a change or break in the rhythmic repetition of the fenestration (Fig. 9),by a more elaborate architectural treatment (Fig. 22), by colour, or any combination of these. A convincing gradation of emphasis from the minor building forms to the major, and then from the major form to its axis and the centre of interest serves to lead the eye to the focal point of the whole design. In Figs. 20 and 26, the subordinate side wings serve to emphasize the dominant form on the axis

of which the main entrance is located. Gradation of emphasis is also of great value in the creation of a sense of unity, order, and co-ordination in elevational design.

(e) Colour Harmony.

Good taste in the choice of colour combinations is a much more difficult, and therefore more important consideration today than it was at the beginning of the century. With the advent of so many new materials in recent years, there has been a proportionate increase in the danger of selecting unsuitable combinations resulting in glaring colour effects. In the days when only local materials were used such a danger was practically negligible. The danger of indigenous materials not harmonizing with the natural setting of the building was very slight. Much good inspiration for modern colour schemes may be drawn from a selective study of old buildings.

In the better examples it will be noted that the larger areas of walls and roofs were either originally treated in reduced colours, or have acquired a mellowness of their own over a period of years due to weathering. The natural colours of stone, brick, slate, and stucco if properly combined are always enhanced by the action of the sun, wind, and rain. If the materials used in the walls or roof require painting, staining, or tinting, as a general rule white or reduced colours should be used. Such an approach to colour is indispensable if the building is one of a row or group, but it is proportionately less essential as the area of the lot is increased and the building becomes more isolated from its neighbours. In the case of country houses and farm buildings, the only consideration is to secure colour harmony within the group itself.

If the general wall and roof surfaces of a building are kept in quiet, reduced colours, the building as a whole will not only combine harmoniously with its neighbours and with nature, but the surfaces themselves will provide the best possible kind of a background for the brighter, gayer colours of the door, window, shutter, and cornice details. Since these are usually constructed of perishable materials such as wood and metal, they require frequent repainting, and so offer a wide scope for the use of concentrated colours. The front entrance as the focal point of the elevation may legitimately command attention through contrast of colour treatment. Everyone is familiar with the fitness and charm of a white doorway set in a red brick wall, or a blue-gray door set in a neutral gray stucco wall.

4. SOME GENERAL STREET AND SITE CONSIDERATIONS

A very common error made in the design of urban buildings is to treat them as isolated units in no way related to the other buildings on the street. Failure to preserve the architectural amenities of the street in this way, together with an unrestrained desire to build on every square inch of ground the law allows, have combined in the past to reduce real estate values, permit the penetration of undesirable elements, and so produce the slum areas with which the majority of our great cities are afflicted. Some safeguards against the nemesis of bad street and site planning have been provided in the form of zoning, property restrictions, and building by-laws; but in the final analysis the aesthetic value of a street depends directly upon the extent to which the

property owners are willing to co-operate. At the present time opportunities for complete unity in street design are fairly well limited to housing schemes and large corporation projects. The majority of smaller buildings, shops and houses, are still designed to express the individualistic ideology of their owners. It is only through education that the advantages to be derived, at no additional cost, from co-operative street and building design will be realized and put into practice. Since the architectural character of the street as a whole depends upon the character of the individual buildings, and since the value of the buildings themselves is to no small extent determined by the character of the street, it is to the mutual advantage of everyone to co-operate to the fullest degree in subordinating his or her individualistic ideology to the achievement of some semblence of architectural unity in the street.

Reference to the various historical styles in which it is the current vogue to dress modern buildings has been purposely omitted in this pamphlet. Real unity in street design does not consist of disguising every building on the same street in identical historical costumes; but rather of observing a few simple rules in site planning, and then designing the buildings according to the fundamental principles outlined in the preceding sections.

The proper orientation of buildings is an important factor in obtaining a sense of order and unity in street design. By orientation is meant in this context the placing of a building on the lot to obtain the maximum sunlight for the greatest number of rooms during the time of year when it is most desired. In its fullest meaning orientation also includes the problems of assuring an adequate circulation of air between the various buildings, and providing the best possible view from each and every window. In the present system of placing buildings so many feet from, and parallel to the curb, it is surprising to find on examination how few windows fulfil their three-fold function of providing light, air, and reasonably unobstructed views.

Fig. 31 is part of the site plan of a recently completed four-block housing scheme. In this example the long arms of each building have been designed to trap the maximum amount of sunlight, and to afford views from every window. This arrangement has the further advantage of providing an adequate circulation of air between the various buildings and at the same time breaking up the prevailing winter winds from the northwest. The architectural unity of the whole group in both plan and elevation is based largely on the acceptance of orientation as a fundamental factor in site planning. Although the buildings are large apartment houses, the same principle of orientation may be applied to the design of detached and semi-detached dwellings.

The number of sides from which a building is to be seen has a direct bearing on the question of unity in street design. A building that is detached or stands by itself requires a different architectural treatment to a semi-detached or row building. The larger the lot on which a detached building is placed, the greater is the latitude permissible in its design; such a building must be designed to be seen from all four sides. A semi-detached or row building is to be seen from one or two sides only, and cannot be designed successfully without due consideration of its immediate neighbours.

Colour is another very important factor in street design. A carefully considered colour scheme can do much to reclaim a street entirely lacking in

unity of architectural form, and conversely architecture of the highest order can be utterly ruined by ill-conceived colour schemes. This does not mean that all the buildings on the same street must have similar colour schemes to avoid clashing with each other. On the contrary, reasonable variety is desirable, provided that it conforms to the simple principles outlined in the section on colour. Monotony of colour is as deadly as monotony of form. Nevertheless, the real danger of disaster lies in an unrestricted and unco-operative use of colour. Each building must be designed to harmonize in colour and form with its neighbours if the architectural unity of the street is to be preserved.

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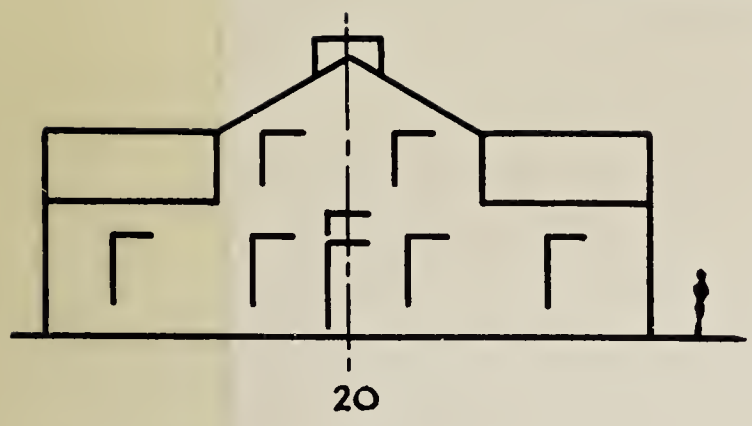
FIGURES 20-31



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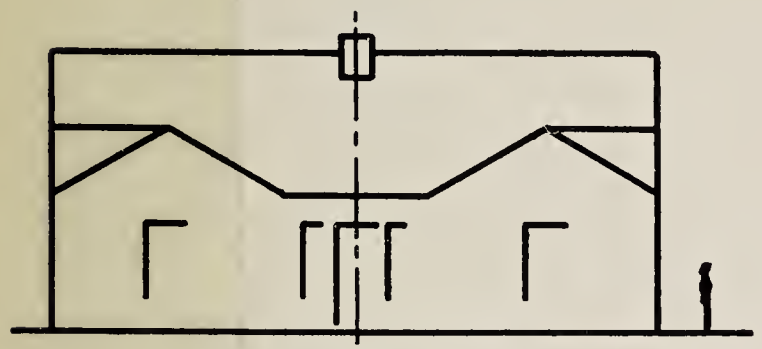

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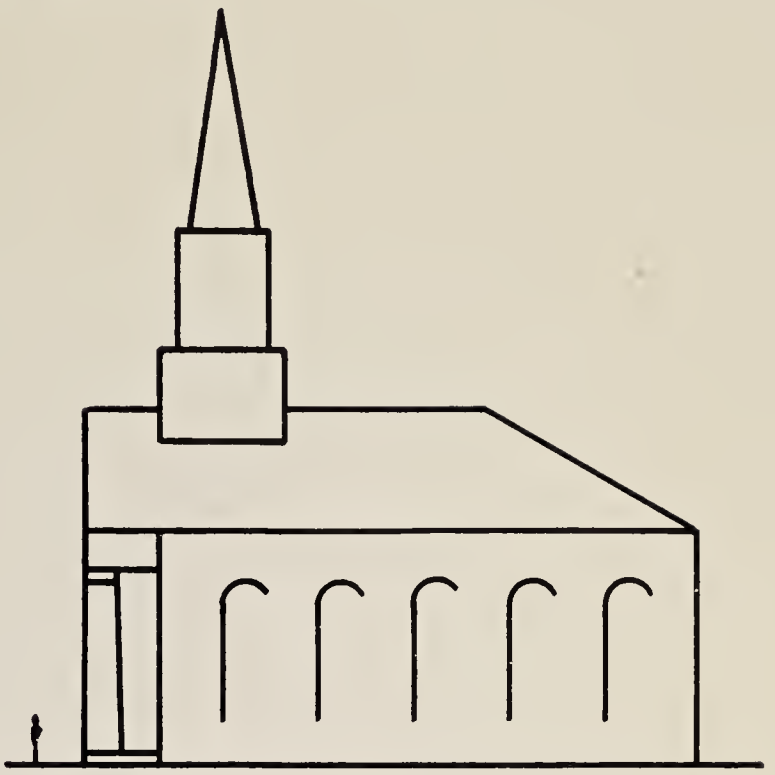

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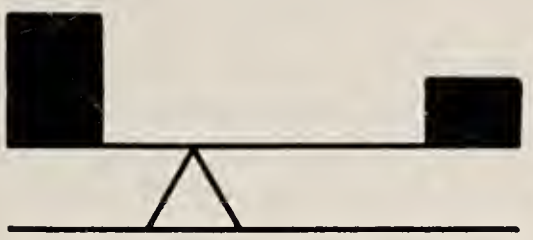

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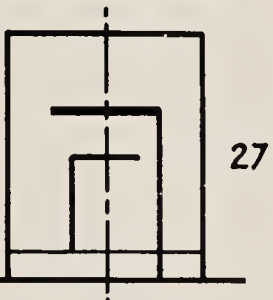

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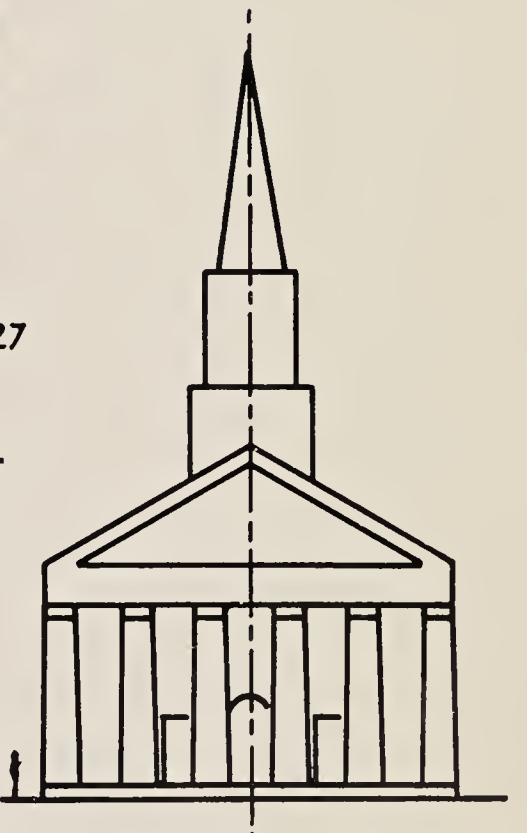

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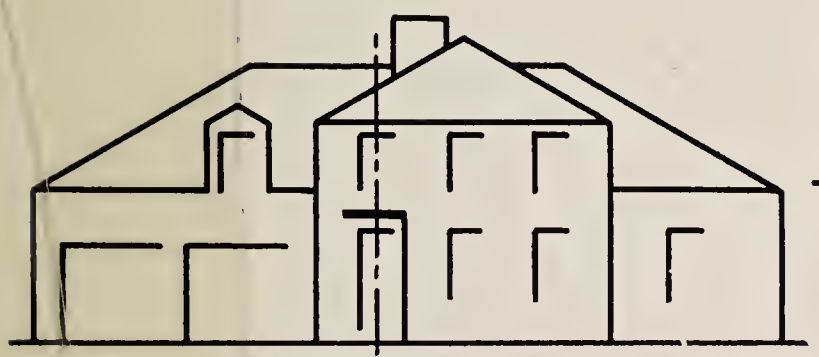

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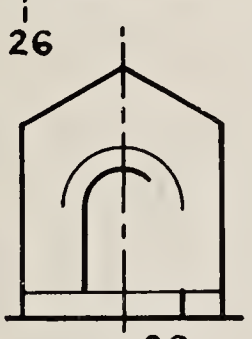

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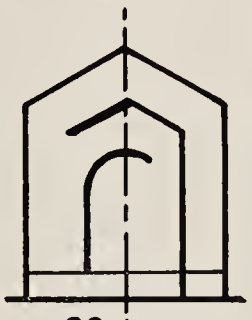

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FIGURES 1-19

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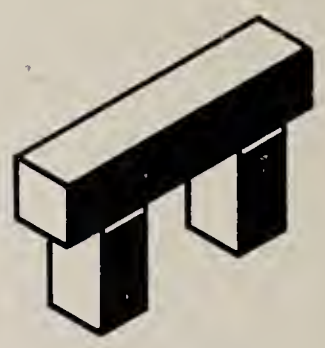

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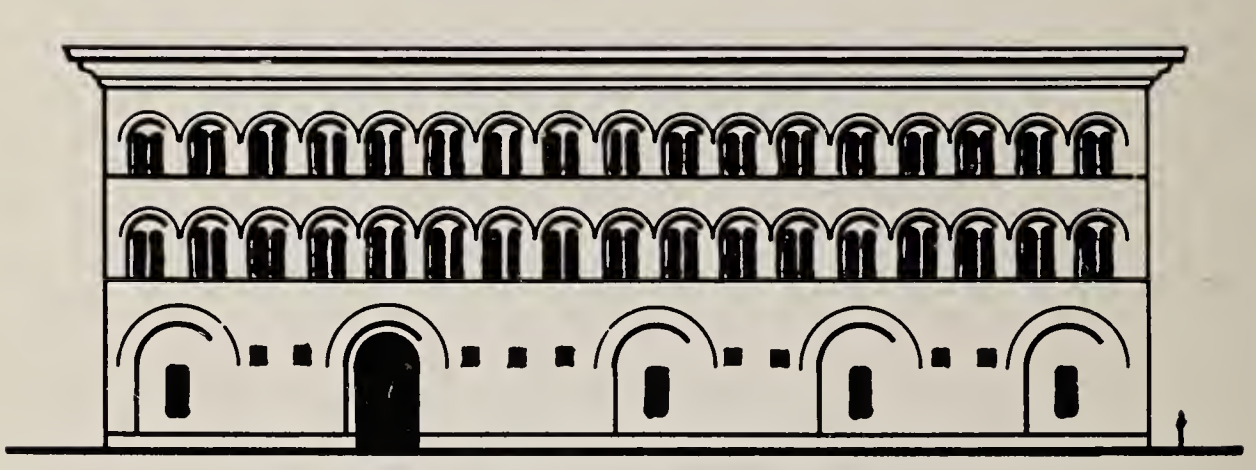

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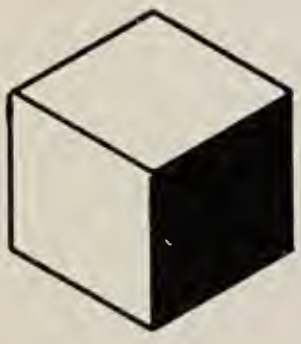

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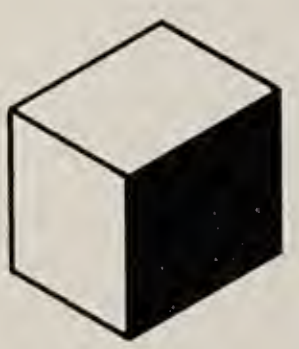

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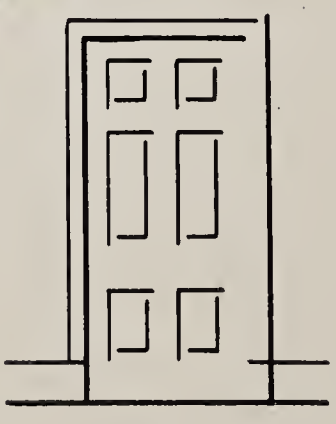

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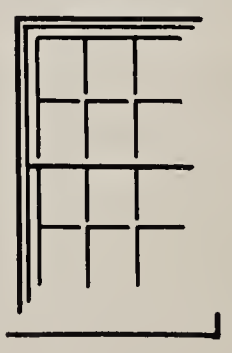

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